

## OIL ADDITIVE KEEPS ENGINES HEALTHY

*This lubricant repairs worn-out spots caused by metal-to-metal contact in automotive engines, restoring lost power, performance, and gas mileage.*



■ RITE SURGE™ (pictured above) is a lead-free engine oil additive developed by Materials Modification.

Before you turn that ignition key, answer this question: Do you know where your car's engine oil is? If you believe the oil is in the engine, you are wrong. Actually, gravity has pulled the engine oil back into the oil pan underneath the car. The oil pump has not yet circulated oil through the engine.

Dry cold starts, as they are called, are particularly hard on your car's engine. Engineering studies show that 70 to 80 percent of all engine wear occurs during that 60 second dry-start period when an engine is first started. Wear is caused by metal-to-metal grinding, and it can destroy vital engine components such as camshafts, leading to engine breakdowns.

Materials Modification, Inc. (MMI; Fairfax, VA), has developed an innovative lubricant that can seal worn-out spots in the engine. By filling these spots, this oil additive can significantly reduce metal-to-metal contact, especially during dry cold starts. Reduced wear also leads to better performance—engine compression and horsepower are increased, giving your car more pep and power. And less engine wear saves you money, in terms of better gas mileage and lower engine repair bills.

**Getting the right mix.** MMI's oil additive is a unique blend of soft metal and copper powders. Ordinarily, these powders would be difficult to mix because the soft metal nanoparticles do not bond well to copper nanoparticles. But MMI adds several proprietary chemicals to increase particle consolidation and create a homogeneously distributed product. BMD's SBIR program funded MMI to develop this materials technology for self-lubricating bearings in space applications. These bearings would be superior to greased bearings, which are prone to outgassing in the vacuum of space. Bearings are typically found in moving mechanical assemblies.

Before pursuing the automotive engine application, MMI discovered commercial satellite and brazing opportunities. "We believe our materials technology would be great for making self-lubricating bearings for communications satellites," says Dr. T.S. Sudarshan, MMI's technical director. "Most people believe that battery life limits satellite lifetimes, but it really is the bearings. Over time, bearings lose their lubrication and the metal-to-metal grinding often corrupts satellite transmissions." Dr. Sudarshan adds that the technology could also be

used to make high-temperature brazing alloys with the fluidity of soft metal but the strength of copper.

MMI researchers also tested the material, along with regular motor oil, in car engines. These tests were very successful, which encouraged MMI to consider how to introduce this product to the automotive market. Unable to commercialize the technology themselves, MMI sold its rights to a group of individuals with significant experience in the automotive industry. This group formed a company to market the new materials technology as an engine oil additive. For three years after this deal was completed, MMI received royalty payments.

**Slick business.** The automotive company annually sells more than 4 million cans of the engine oil additive, split evenly between Europe and the United States. In the United States, the company's product can be found on the shelves of many automotive product retailers, including TrakAuto, WalMart, and Kmart.

In recent years, the Environmental Protection Agency has become increasingly concerned about lead-based products and their adverse effects on the environment. It has proposed environmental regulations that would ban the production and sale of many of these products by the year 2000. These regulations could significantly curtail the sale of lead-containing additives for car engines.

To address these environmental concerns, MMI has formulated a new lead-free engine oil additive called RITE SURGE™ while working on a U.S. Army contract. This additive, which is environmentally safe, is specifically designed for high-mileage vehicles. Like its predecessor, it repairs and seals grooves and other damage to engine parts caused by wear. MMI is ready to begin production of RITE SURGE and is currently seeking national distributors.

■ For more information, contact Dr. T.S. Sudarshan via telephone at (703) 560-1371 or via E-mail at [sudarshan@compuserve.com](mailto:sudarshan@compuserve.com). You can also visit MMI's Web site at <http://www.matmod.com>.



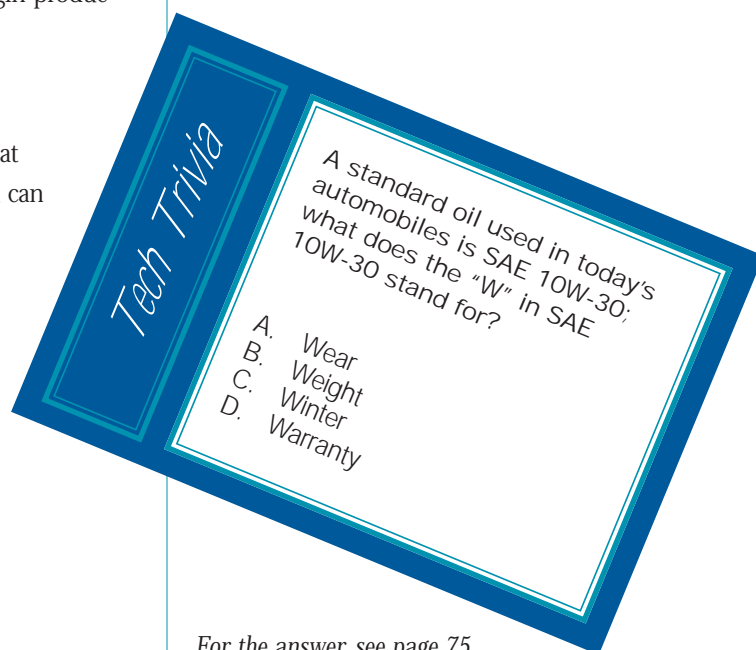
#### What Does It Mean to You?

Oil additives for automotive engines save you money by preventing untimely engine breakdowns and even vehicle replacements.



#### What Does It Mean to Our Nation?

Oil additives help car engines achieve better gas mileage, which results in less air pollution.



For the answer, see page 75.